WHAT IS CLAIMED IS

1. Device for determining at least the blood flow through at least a selected half of a coronary artery system of a beating heart of a mammal, in particular a human being, during a beat of said heart, comprising a bioimpedance measuring device for measuring an impedance signal Z that depends on said blood flow through at least said selected half of said coronary artery system, which bioimpedance measuring device comprises a current source, supply electrodes, one or more upper measuring electrodes, one or more lower measuring electrodes and measuring means, and further comprising processing means which are connected to said measuring means, for processing of at least a value of said impedance signal Z, and for determining a first time-derivative dZ/dt of said impedance signal Z, wherein said processing means further comprise means for separating from said first time-derivative dZ/dt a peak signal PS corresponding to said selected half of said coronary artery system, which peak signal PS lies within a time interval between the beginning of diastole of said heartbeat and the end of a second peak signal PS2 of said first time-derivative dZ/dt which occurs second after said beginning of diastole,
and wherein said processing means are designed to determine said blood flow from said peak signal PS.

2. Device according to claim 1, wherein said processing means are designed to determine said blood flow through said selected half of said coronary artery system from a first peak signal PS1 which occurs first after said beginning of diastole of said heart beat, in the case that said selected half of said coronary artery system is the left half of said coronary artery system of said heart.

3. Device according to claim 1, wherein said processing means are designed to determine said blood flow through said selected half of said coronary artery system from said second peak signal PS2 which occurs second after said beginning of diastole of said heartbeat, in the case that said selected half of said coronary artery system is the right half of said coronary artery system of said heart.

4. Device according to claim 1, wherein the processing means are further designed to determine the duration TCAFT that corresponds

to the total coronary artery flow time of said coronary artery system, and further to determine the blood flow volume through said selected half of said coronary artery system during said heart beat, according to

$CQ = C/(Z_0H)^2 \cdot TCAFT \cdot (MCdZ/dt)$, in which

C = a predetermined constant,

MCdZ/dt = maximum value of said separated peak signal PS, and

Z_0H = value of the impedance of the thorax of said mammal at the time of MCdZ/dt, during said heartbeat,

wherein TCAFT is determined as the time between the beginning of the first peak signal PS1 and the end of diastole of said heartbeat, and wherein the measuring electrodes have been placed at the midneck region and at the xiphoid junction of said mammal.

5. Device according to claim 4, wherein C has been set equal to $C = \rho \cdot (Lm)^2$, in which ρ = the specific resistivity of the blood of said mammal, and Lm = the myocardial distance from an aortic valve of said heart to the apex of said heart.

6. Device according to claim 5, wherein said resistivity ρ is set equal to $\rho = 53.2 \cdot e^{0.022 \cdot Hct}$, wherein Hct is the hematocrit value of a sample of the blood of said mammal.

7. Device according to claim 4, wherein the processing means are further designed to determine a heart rate in beats per unit time, and further designed to determine a blood flow volume CAQ per unit time through said selected half of said coronary artery system, according to

$CAQ = CQ \cdot HR$.

8. Device according to claim 4, wherein the processing means are further designed to determine the total blood flow volume through said coronary artery system as the sum of said coronary blood flow volume for said left half of said coronary artery system and said coronary blood flow volume for said right half of said coronary artery system.

9. Method for determining at least the blood flow through at

least a selected half of a coronary artery system of a beating heart of a mammal, in particular a human being, during a beat of said heart, comprising the steps of

- applying upper and lower measuring electrodes to the body of said mammal, wherein said selected half of said coronary artery system is completely between said upper and lower measuring electrodes,
- measuring an impedance signal Z which depends on the blood flow through said selected half of said coronary artery system, by means of a bioimpedance measuring device which is connected to said upper and lower measuring electrodes,
- determining a first time-derivative dZ/dt of said impedance signal Z,
- separating from said first time-derivative dZ/dt a peak signal PS which corresponds to said selected half of said coronary artery system, which peak signal PS lies within a time interval between the beginning of diastole of said heart during said heartbeat and the end of a second peak signal PS2 of said first time-derivative dZ/dt which occurs second after said beginning of diastole, and
- determining said blood flow from said separated peak signal PS.

10. Method according to claim 9, wherein said blood flow through said selected half of said coronary artery system is determined from a first peak signal PS1 which occurs first after said beginning of diastole of said heart beat, in the case that said selected half of said coronary artery system is the left half of said coronary artery system of said heart.

11. Method according to claim 9, wherein said blood flow through said selected half of said coronary artery system is determined from said second peak signal PS2 which occurs second after said beginning of diastole of said heart beat, in the case that said selected half of said coronary artery system is the right half of said coronary artery system of said heart.

12. Method according to claim 9, wherein a blood flow volume CQ during said heartbeat through said selected half of said coronary artery system during said heart beat is determined, according to $CQ = C/(Z_0H)^2 \cdot TCAFT \cdot (MCdZ/dt)$, in which

C = a predetermined constant,

MCdZ/dt = maximum value of said separated peak signal PS,

Z_0H = value of the impedance of the thorax of said mammal at the time of MCdZ/dt, during said heartbeat, and

TCAFT = total coronary artery flow time = time between the beginning of the first peak signal PS1, and the end of diastole of said heartbeat,

wherein said upper measuring electrodes, lower measuring electrodes, respectively, have been applied at the middle neck region, at the xiphoid junction of the sternum of said mammal, respectively.

13. Method according to claim 12, wherein C is set equal to $C = \rho \cdot Lm^2$, in which

ρ = specific resistivity of the blood of said mammal, and

Lm = the myocardial distance from an aortic valve of said heart to the apex of said heart.

14. Method according to claim 13, wherein said resistivity ρ is set equal to $\rho = 53.2 \cdot e^{0.022 \cdot Hct}$, wherein Hct is the hematocrit value of a sample of the blood of said mammal.

15. Method according to claim 12, further comprising the steps of determining the heart rate HR in beats per unit time, and determining the blood flow volume CAQ per unit time through said selected half of said coronary artery system, according to $CAQ = CQ \cdot HR$.

16. Method according to claim 12, further comprising the step of determining the total value of the blood flow volume through said coronary artery system during said heartbeat as the sum of the blood flow volume through the left half of said coronary artery system and the blood flow volume through the right half of said coronary artery system.

17. Method according to claim 15, further comprising the step of determining the total value of the blood flow volume per unit time through said coronary artery system during said heartbeat as the sum of the blood flow volume per unit time through the left half of said coronary artery system and the blood flow volume per unit time

through the right half of said coronary artery system.